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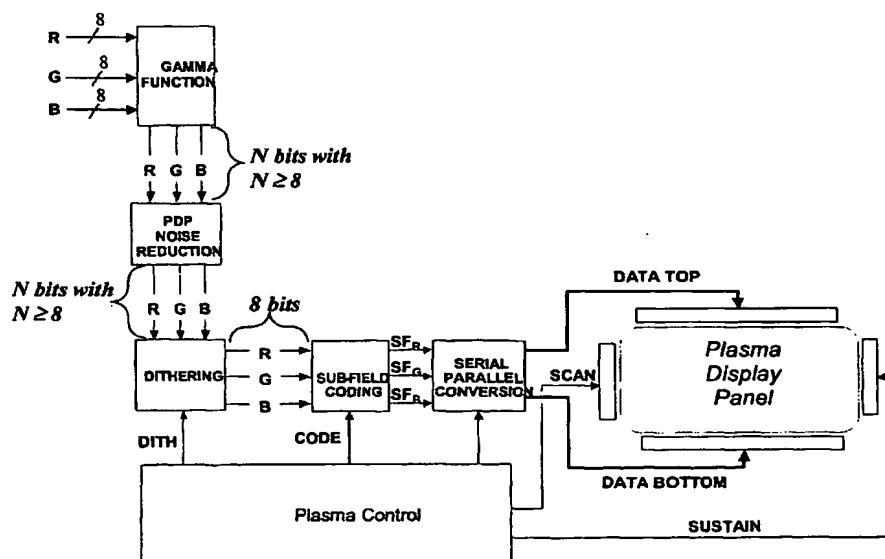
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(54) Title: ADAPTIVE NOISE REDUCTION FOR DIGITAL DISPLAY PANELS



(57) Abstract: A plasma display panel is a pure linear display and does not provide a nonlinear gamma behaviour like a CRT so that an artificial gamma function has to be applied to the signal in digital form. This gamma function increases the quantization steps in the dark areas whereas the quantization steps will be reduced in the luminous reas. The basic idea is to apply an adaptive noise filtering after the gammatization process. The adaptive filtering is a specific filtering which is adapted to the gammatization quantization noise. In other words, the filtering will be maximum for dark areas and its efficacy will be automatically decreased when the luminance of the area is increasing.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6 340 994 B1 (FOGG CHAD ET AL) 22 January 2002 (2002-01-22) abstract column 5, line 24 - line 41 column 21, line 43 - column 22, line 7; figure 10	1-5, 10-14 6-9, 15, 16
A	EP 0 893 916 A (MATSUSHITA ELECTRIC IND CO LTD) 27 January 1999 (1999-01-27) abstract column 12, line 3 - line 42 column 26, line 6 - line 23; figures 10, 34 -/-	1-16

☒ Further documents are listed in the continuation of box C.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 6 417 835 B1 (OTAKA NOBUAKI ET AL) 9 July 2002 (2002-07-09) abstract column 8, line 31 - line 55 column 10, line 28 - line 37 column 19, line 5 - line 39 column 44, line 57 - column 46, line 29; figures 20, 22, 71, 72</p> <p>----</p>	1-16
A	<p>EP 1 136 974 A (THOMSON BRANDT GMBH) 26 September 2001 (2001-09-26) cited in the application abstract page 3, line 19 - line 23 page 10, line 47 - page 11, line 47; figure 4</p> <p>-----</p>	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/50362

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6340994	B1	22-01-2002	WO 0010323 A1 WO 0010129 A1 US 2002171649 A1 US 6456340 B1	24-02-2000 24-02-2000 21-11-2002 24-09-2002
EP 0893916	A	27-01-1999	EP 1331626 A2 EP 0893916 A2 JP 3425083 B2 JP 11231827 A JP 2003162247 A JP 2003150102 A JP 2003153130 A JP 2003150103 A US 6310588 B1 US 2001028347 A1 JP 3414265 B2 JP 11212517 A JP 2003223132 A	30-07-2003 27-01-1999 07-07-2003 27-08-1999 06-06-2003 23-05-2003 23-05-2003 23-05-2003 30-10-2001 11-10-2001 09-06-2003 06-08-1999 08-08-2003
US 6417835	B1	09-07-2002	JP 3322809 B2 JP 10031455 A US 2002130826 A1 FR 2740253 A1 JP 3365630 B2 JP 2002278511 A US 2001045923 A1 US 6144364 A	09-09-2002 03-02-1998 19-09-2002 25-04-1997 14-01-2003 27-09-2002 29-11-2001 07-11-2000
EP 1136974	A	26-09-2001	EP 1136974 A1 AU 3928301 A WO 0171702 A2 EP 1269457 A2 US 2003103059 A1	26-09-2001 03-10-2001 27-09-2001 02-01-2003 05-06-2003